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## CAREX FOENEA, C. STRAMINEA AND C. ALBICANS IN WILLDENOW'S HERBARIUM

H. K. SVENSON

The exact identity of these three American species of *Carex* has always been somewhat confusing, and the temptation to examine the actual types could not be resisted when, through the kindness of Dr. Diels and Dr. Pilger, it was my privilege during the past summer to examine the Cyperaceae in the Willdenow Herbarium at the Royal Botanic Garden in Berlin. Since the results of this examination contradict the generally accepted interpretations of these species, I am providing somewhat detailed notes on the specimens.

**CAREX FOENEA** Willd. It is obvious that Willdenow's brief diagnosis was based on the single sheet (no. 17167) in the Willdenow Herbarium. Unfortunately the type collection is without rootstocks, but each of the three fruiting culms bears 3 to 5 leaves which are 3 mm. wide, and has an inflorescence (approximately 2 cm. long) composed of aggregated spikes. The acute hyaline scales with greenish midrib are equalled by the perigynia. The perigynia are mature and measure 5 mm. long by 1.5 mm. wide, with the outer face showing four prominent nerves over the distended achene and similar nervation on the inner face, the most striking feature being the long smooth to slightly-serrulate beak, which rises abruptly from the narrowly winged body of the perigynium. Therefore, the type of *C. foenea* is not the plant with moniliform inflorescence with which the name has been associated, but the species long known as *C. siccata* Dewey. The only other possible disposal of this material, grown at an early date at the Berlin Botanic Garden, would be to treat it as a short-

headed and aberrant *C. bromoides*, an interpretation which under the circumstances would not be plausible.

It may be noted that Dewey's diagnosis of *C. siccata*,<sup>1</sup> a plant originally described from Westfield, Massachusetts, is closely similar to that of *C. foenea*, and both are included here for comparison.

*C. SICCATA* Dewey. "Spica composita, distigmatica; spicula terminali androgyna, superne staminifera obtusa; spiculis inferis subquaternis staminiferis ovatis acutiusculis, infime saepe inferne fructifera cum bractea squamosa oblongo-lanceolata, omnibus ovatis acutiusculis approximatis; fructibus ovato-lanceolatis acuminatis compressis margine scabris bifidis nervosis, squamam ovato-lanceolatam subaequantibus.

*CAREX FOENEA* Willd.<sup>2</sup> "C. spica androgyna composita, spiculis subquaternis, inferne masculis, approximatis, fructibus ovatis acuminatis marginatis bidentatis, squamam oblongo-lanceolatam subaequantibus. *Habitat in America boreali.* Carici stramineae et festuceae proxima."

Dewey recognized the exceedingly close relationship of *C. siccata* to *C. intermedia* Good. (*C. disticha* Hudson) of northern Europe; his illustration (l. c., t. F. fig. 18) was poor and misleading, which he himself probably realized in admitting that "The figure of our plant does not show the usual number of spikelets." But how could the identity of *Carex foenea* have remained so in obscurity? *Carex* in eastern America has been studied from early times by botanists of experience and judgment—Schweinitz, Dewey, Torrey, Tuckerman, Boott—not to mention those of the present day. In the beginning, Willdenow (1809) described aberrant, soft, short-headed specimens from cultivated material, lacking entirely the characteristic rootstocks. He allied his new species (*C. foenea*) with *Carex straminea* and *C. festucea*, probably without clear impression of the identity, to say the least, of *C. straminea* (see discussion under that species). Willdenow's correspondent, Muhlenberg, also had specimens of "*C. foenea*" and upon those Torrey and Schweinitz<sup>3</sup> based their conception of *Carex foenea*, and described the species as follows:

"*CAREX FOENEA*, Muhlenberg. C. spiculis pluribus (8-10,) compositis, inferioribus distinctis, superioribus confluentibus; fructibus ovatis, acuminatis, alatis, bidentatis, glumis ovatis paulo longioribus. Obs. This species is nearly related to *C. lagopodioides* [*C. tribuloides* Wahl.]"

Continuing this interpretation, Torrey<sup>4</sup> treated *C. foenea* as a marsh plant with subglobose spikelets, and to him it represented the coastal

<sup>1</sup> Am. Jour. Sc. x. 278 (1826).

<sup>2</sup> Enum. Pl. 957 (1809).

<sup>3</sup> Ann. Lyc. N. Y. i. 315 (1825).

<sup>4</sup> Compend. Fl. Northern & Middle States, 338 (1826).

plain species until recently known as *C. albolutescens* Schweinitz. It is true that Torrey did actually seek out the identity of Willdenow's specimen, but he got from Schlechtendal<sup>1</sup> only the worse than useless notation: "*C. foenea* n. 17,167.—Specimina hortensia Tuis flaccidior sed nullo alio modo diversa." [The garden specimens are softer than yours but in no other way different].

The unknown character of *Carex straminea* now intruded into the foreground, with Torrey, as well as other botanists of his period, trying to reconcile Schkuhr's two diverse figures of that species. Torrey, in his monograph of North American Cyperaceae,<sup>2</sup> believing with reason that *C. foenea* was a member of the *Ovales*, forthwith placed it as a variety under *C. straminea* and there it remained. Even Kunth, the outstanding master of the Cyperaceae, followed Willdenow, Torrey and Dewey in placing *C. foenea* in the *Ovales*, and thought it only a garden form of *C. scoparia*.<sup>3</sup> But Kunth did provide an excellent description of the type specimen, which might well have been given closer attention by subsequent botanists. The complete state of confusion in this group of *Carex* was well recognized by Tuckerman<sup>4</sup> who, including *C. foenea* and several species of *Ovales* under *C. straminea*, noted that if *Carex foenea* was a poor species, *Carex festucacea* appeared to be even worse.

The question naturally arises as to why Willdenow allied *C. foenea* with the *Ovales*. The answer, I believe, is that the position of staminate flowers in *C. foenea* (*C. siccata* Dewey) is extremely variable. The middle staminate spikes of the densely aggregated inflorescence could easily be taken for bases of androgynous spikes and I have, moreover, found pistillate spikes in *C. siccata* bearing a few stamens at the base. Willdenow's somewhat aberrant specimens of *C. foenea* were very mature, a situation which would not help any decision as to the actual location of stamens.

At a time when *C. foenea* was being treated as a member of the *Ovales* by all competent American botanists, L. H. Bailey examined the type in the Willdenow Herbarium<sup>5</sup> and identified *C. foenea* with Tuckerman's *C. argyrantha*, described by Dewey in 1860. DeCandolle states in his "Phytographie" (p. 18) that some of Schkuhr's

<sup>1</sup> *Linnaea*, x. 261 (1836).

<sup>2</sup> *Ann. Lyc. N. Y.* iii. 395 (1836).

<sup>3</sup> *Enum. Pl.* ii. 398 (1837).

<sup>4</sup> *Enum. Caricum*, 18 (1843).

<sup>5</sup> *Mem. Torr. Bot. Club.* i. 3 (1889).

*Carices* are at Halle. However, the herbarium at Halle was examined by Bailey (l. c.), who makes the following illuminating comment on Willdenow's collection at Berlin: "This herbarium contains most of the types of Muhlenberg and Schkuhr. The specimens were probably furnished entirely by Muhlenberg to Willdenow, and by Willdenow lent to Schkuhr. It appears from comparisons of Willdenow's specimens with Schkuhr's plates, that most if not all of the specimens from which the drawings were made, were returned to Willdenow. Duplicates were retained by Schkuhr." And further (p. 26): "The species [*C. foenea*] as I have drawn it, includes larger forms than those described either by Willdenow or Tuckerman. Willdenow's specimens, particularly, are weak and short-headed, but as they were from cultivated plants they cannot be regarded as wholly representative of the species. The specimens of *C. foenea* in Willdenow's herbarium are immature, but the characters are evident. Moreover, among the specimens of *C. ovalis*, in Willdenow's collection, is a sheet of the same, the specimens being more developed. This sheet is evidently from the same plant as the original; in fact, in the general herbarium at Berlin this plant is again mixed with '*C. ovalis*', and as *C. ovalis* was cultivated in the gardens at that time (*vide* Enum. Pl. Hort. Berol.), it is apparent that the original *C. foenea* was mixed with it in culture. It is evident, therefore, that the specimens lying with *C. ovalis*, both in Willdenow's herbarium and in the general collection, are duplicates of the type. These duplicates are important, for they are mostly mature, although they differ in no other respect from Willdenow's type specimens." It is thus easy to see how Willdenow's no. 17167, supposed to be an immature cultivated specimen of a species belonging to the *Ovales*, could be readily passed over for the selection of a more satisfactory type.

*Carex siccata* Dewey (and of recent authors) must now be treated as a synonym of *C. foenea* Willd. For the plant with moniliform inflorescence passing as *C. foenea* the correct name appears to be *C. argyrantha* Tuckerm. Although typified by slender plants (such as Olney's distribution from the type station at Hadley, Massachusetts), *C. argyrantha* passes to coarse plants, occasionally with compound spikes (cf. Boott, t. 381), such as are often found on newly-constructed roadbanks and in other localities where conditions are favorable for growth. This robust form, known as *C. foenea* var. *perplexa* Bailey (cf. Robinson & Fernald in Gray, Man. ed. 7, fig. 367 (1908) ), has

strongly ribbed perigynia a trifle larger, but otherwise identical, with those of Olney's distribution.

**CAREX STRAMINEA.** Two sheets (no. 17177) are represented in Willdenow's herbarium but only the first, labeled "Klaproth" "Am. Bor.," conforms to the diagnosis on the species cover: "*Carex straminea* spiculis androgynis ovatis distantibus et inferne masculis capsulis acuminatis hispidis" and to Willdenow's own description.<sup>1</sup> This fragmentary specimen, consisting only of the upper part of a culm, bears a flexuous inflorescence (4 cm. long) of five somewhat distant spikes, the uppermost of which is 10 mm. long, including the strongly clavate base. Those perigynia which have not fallen project beyond the subulate glistening-brown (almost coppery) scales, both perigynia and scales contributing to the echinate appearance of the inflorescence. The broadly obovate golden-brown perigynia (4.5 mm. long and 2.5 mm. wide) are strongly winged, with 10 to 12 distinct nerves on each face, and the margin of the beak is finely and irregularly toothed. These characteristics seem to delineate the plant as *Carex Richii* and nothing else.<sup>2</sup>

Bailey,<sup>3</sup> having described the perigynia of *C. straminea* as "small and comparatively narrow, often long-pointed," notes that this weak plant was the species "originally described and figured by Schkuhr." Consequently, when Fernald (*RHODORA* viii. 165 (1906) ) saw the actual type of *C. tenera* in Dewey's herbarium, he recognized it as the small representative of *C. straminea* which had been considered as typical by Boott and presumably by Bailey, and applied the new name *Carex hormathodes* to the larger plant of the coastal marshes. From *C. hormathodes* the var. *Richii* has been segregated as a distinct species, and as such was typified by Mackenzie.<sup>4</sup> In Boott's illustration of *C. straminea* var. *aperta*,<sup>5</sup> the inflorescence to the right is exceedingly close to Willdenow's type of *C. straminea*, and so is the achene which he has illustrated in full. Schkuhr's illustration,<sup>6</sup> except for the stamens which were probably included on general principles, is a moderately good representation, though conventionalized and slightly reduced, of Klaproth's specimen.

<sup>1</sup> Sp. Pl. iv. 242 (1805).

<sup>2</sup> Professor Fernald concurs with me in this interpretation.

<sup>3</sup> Mem. Torrey Club, i. 22 (1889).

<sup>4</sup> N. Am. Fl. xviii. 160 (1931).

<sup>5</sup> Ill. Carex, t. 385 (1862).

<sup>6</sup> Riedgr. t. G. fig. 34 (1801).

The second sheet of *Carex straminea* in Willdenow's herbarium bears the annotation "Carex 43 Muhl. W.," and "Muhlenberg misit." It consists merely of a non-flexuous inflorescence of six greenish, nearly approximate spikes. The surface of the immature ovate perigynia (3.0 x 1.5 mm.) shows no satisfactorily definite veining, but is rather prominently reticulate. The narrow, acute, rigid scales are shorter than the perigynium, the beak of which is irregularly but strongly serrulate, with a tubular (i. e. not strongly bidentate) opening. In my opinion this specimen is *Carex normalis* Mack. (*C. mirabilis* Dewey). It has no value in fixing the type of *C. straminea*, but has contributed to the inordinate confusion which surrounds the species. Sketches of the type of *C. straminea* which I have seen at the Gray Herbarium are of this Muhlenberg specimen.

At a comparatively early date, Bailey<sup>1</sup> had revived the original name, *C. albolutescens* Schweinitz, for *Carex straminea* var. *foenea* Torr. Later, Mackenzie (Bull. Torrey Club, xlii. 605 (1915) ), emphasizing the *obovate* character of the perigynium as described by Schkuhr, saw the "real" *Carex straminea* as a distinct plant having a strong resemblance to *C. alata*, with stiff inflorescence, perigynia 5-7-nerved ventrally, and greenish scales, and in 1922,<sup>2</sup> the conclusion was reached by Mackenzie that Schweinitz's type of *C. albolutescens* was the "real" *C. straminea*. Accordingly *C. albolutescens* was relegated to synonymy and the old "*C. albolutescens*" became *C. Longii* Mack. The identity of the type of *C. straminea* having now been cleared up, the name *Carex albolutescens* can happily be restored, and that of *Carex Longii*, if actually distinct from *C. albolutescens*, can be likewise maintained.

*C. ALBICANS* Willd. ex Sprengel.<sup>3</sup> The specimen was briefly described as follows: "C. spicis ♀ subternis lanceolatis erectis approximatis, fructibus lanceolatis squamam nitide albam aequantibus. Carolina." The type in the Willdenow Herbarium (no. 17259) from "Carolina boreali," said by Schlechtendal (Linnaea, x. 264 (1836) ) to have come from Desfontaines, is a poor juvenile specimen resembling *C. varia*, but characterized by short, narrow, and exceedingly rigid leaves. It seems impossible to determine what this wretched little plant may be, denounced by Kunth<sup>4</sup> with the words: "Fieri potest, ut

<sup>1</sup> Bull. Torrey Club, xx. 421 (1893).

<sup>2</sup> Bull. Torrey Club, xlix. 373 (1922) and also in N. Am. Fl. xviii. 162 (note) (1931).

<sup>3</sup> Syst. iii. 818 (1826).

<sup>4</sup> Enum. ii. 474 (1837).

species secundum talia specimina instituatur." [Is it possible that a species could be based on such specimens?]. *C. albicans*, possibly representing a very aberrant *C. nigro-marginata*, does not closely resemble any other specimen which I have seen. It is definitely not the plant now called *C. Peckii*, nor the coastal representative of *C. varia* with soft leaves and short staminate spikes, treated as *C. albicans* by Mackenzie.<sup>1</sup> It would seem best to drop the name entirely.

BROOKLYN BOTANIC GARDEN.

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CONTRIBUTION FROM THE GRAY HERBARIUM OF  
HARVARD UNIVERSITY—NO. CXXII

(Concluded)

VIII. NEW SPECIES, VARIETIES AND TRANSFERS

M. L. FERNALD

(Plates 497–507)

RECENT studies of plants of various groups in eastern North America have necessitated the changes of some names and combinations and the description of several heretofore unrecognized spermatophytes. The illustration of many of the latter has been made possible through grants for research from the Division of Biology of Harvard University and through the photographic skill of Dr. E. C. OGDEN or of my son, HENRY G. FERNALD.

ERAGROSTIS TRICHODES (Nutt.) Nash., var. **pilifera** (Scheele), comb. nov. *E. pilifera* Scheele in *Linnaea*, xxii. 344 (1849).

PANICUM (sub-§SCOPARIA) **recognitum**, sp. nov. (TAB. 497, 498), planta cespitosa 0.6–1.5 m. alta; culmis firmis basi 2–3 mm. diametro, internodiis elongatis 6 vel 7, glabris; nodis plerumque glabris vel glabratis; foliis rosulatis basilaribus lanceolatis firmis glabris 3–3.5 cm. longis 5–9 mm. latis 40–54-nerviis; foliis caulinis primariis 5–7 lanceolatis firmis glabris acuminatis 0.6–1.3 dm. longis 0.8–1.5 cm. latis basi cordatis ciliatis, vaginis horizontaliter hirsutis vel glabratis pilis basi bullatis, ligulis obsoletis; paniculis primariis deinde exsertis ovoideis vel ellipsoideis 0.8–1.3 dm. longis 6–10 cm. diametro, rhachi glabro, ramibus patento-adscendentibus minute barbellatis, pulvinis pubescentibus, pedicellis elongatis barbellulatis; spiculis pubescentibus ellipsoideis basi apiceque obtusis 2.2–2.8 mm. longis 1.2 mm. latis,

<sup>1</sup> N. Am. Fl. xviii. 190 (1935).